

Clean Version of Pending Claims

**SPACE BASED AUGMENTATION SYSTEM WITH HIERARCHY FOR DETERMINING
GEOGRAPHICAL CORRECTIONS SOURCE**

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1. A method, comprising:
 - receiving Space Based Augmentation System (SBAS) correction messages from a selected SBAS satellite;
 - determining whether at least one criterion is satisfied for using the selected SBAS satellite as a correction source; and
 - upon determining that the at least one criterion is not satisfied for using the selected SBAS satellite as a correction source, selecting a second SBAS satellite to be used as a correction source from which to receive SBAS correction messages.
 2. The method of claim 1, wherein determining whether at least one criterion is satisfied for using the selected SBAS satellite as a correction source includes determining whether the selected SBAS satellite is sending SBAS correction messages.
 3. The method of claim 1, wherein determining whether at least one criterion is satisfied for using the selected SBAS satellite as a correction source includes determining whether the SBAS correction messages received from the selected SBAS satellite are reliable.
 4. The method of claim 3, wherein determining whether the SBAS correction message received from the selected satellite is reliable includes:
 - determining whether the SBAS correction messages received from the selected satellite are less reliable than SBAS correction messages received from the second SBAS satellite; and
 - upon determining that the SBAS correction messages received from the selected satellite are less reliable than SBAS correction messages received from a second SBAS satellite,

determining whether a stability threshold is exceeded.

5. The method of claim 1, wherein determining whether at least one criterion is satisfied for using the selected SBAS satellite as a correction source includes determining whether a differential position can be created from the received SBAS correction messages.

6. The method of claim 5, wherein determining whether a differential position can be created from the received SBAS correction messages is periodically performed.

7. The method of claim 1, wherein determining whether at least one criterion is satisfied for using the selected SBAS satellite as a correction source includes:

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determining whether the selected SBAS satellite is sending SBAS correction messages;
and
determining whether the SBAS correction messages received from the selected SBAS satellite are reliable.

8. The method of claim 1, wherein determining whether at least one criterion is satisfied for using the selected SBAS satellite as a correction source includes:

determining whether the selected SBAS satellite is sending SBAS correction messages;
and
determining whether a differential position can be created from the received SBAS correction messages.

9. The method of claim 1, wherein determining whether at least one criterion is satisfied for using the selected SBAS satellite as a correction source includes:

determining whether the SBAS correction messages received from the selected SBAS satellite are reliable; and

determining whether a differential position can be created from the received SBAS correction messages.

10. The method of claim 1, wherein determining whether at least one criterion is satisfied for using the selected SBAS satellite as a correction source includes:

determining whether the selected SBAS satellite is sending SBAS correction messages;

determining whether the SBAS correction messages received from the selected SBAS satellite are reliable; and

determining whether a differential position can be created from the received SBAS correction messages.

11. The method of claim 1, wherein determining whether at least one criterion is satisfied for using the selected SBAS satellite as a correction source includes:

determining whether the selected SBAS satellite is sending SBAS correction messages;

upon determining that the selected SBAS satellite is sending SBAS correction messages, determining whether the SBAS correction messages received from the selected SBAS satellite are reliable; and

upon determining that the SBAS correction messages received from the selected SBAS satellite are reliable, determining whether a differential position can be created from the received SBAS correction messages.

12. A method in a global positioning system (GPS) for determining a Wide Area Augmentation System (WAAS) corrections source, comprising:

synchronizing to signals from at least two WAAS satellites;

selecting one WAAS satellite from which to receive WAAS correction messages;

receiving WAAS correction messages from the selected WAAS satellite;

determining whether at least one criterion is satisfied for using the selected WAAS

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satellite as a correction source; and

upon determining that the at least one criterion is not satisfied for using the selected WAAS satellite as a correction source, selecting a second WAAS satellite to be used as a correction source from which to receive WAAS correction messages.

13. The method of claim 12, wherein determining whether at least one criterion is satisfied for using the selected WAAS satellite as a correction source includes:

determining whether the selected WAAS satellite is sending WAAS correction messages;

upon determining that the selected WAAS satellite is sending WAAS correction messages, determining whether the WAAS correction messages received from the selected WAAS satellite are reliable; and

upon determining that the WAAS correction messages received from the selected WAAS satellite are reliable, determining whether a differential position can be created from the received WAAS correction message.

14. A computer-readable medium having computer-executable instructions adapted to:

synchronize to signals from at least two Space Based Augmentation System (SBAS) satellites;

select one SBAS satellite from which to receive correction messages;

receive correction messages from the selected SBAS satellite;

determine whether at least one criterion is satisfied for using the selected SBAS satellite as a correction source; and

select a second SBAS satellite to be used as a correction source from which to receive correction messages if the at least one criterion is not satisfied for receiving correction messages from the selected SBAS satellite.

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15. The computer-readable medium of claim 14, wherein the computer-executable instructions adapted to determine whether at least one criterion is satisfied for using the selected SBAS satellite as a correction source include computer-executable instructions adapted to determine whether the selected SBAS satellite is sending SBAS correction messages.

16. The computer-readable medium of claim 14, wherein the computer-executable instructions adapted to determine whether at least one criterion is satisfied for using the selected SBAS satellite as a correction source include computer-executable instructions adapted to determine whether the SBAS correction messages received from the selected SBAS satellite are reliable.

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17. The computer-readable medium of claim 14, wherein the computer-executable instructions adapted to determine whether at least one criterion is satisfied for using the selected SBAS satellite as a correction source include computer-executable instructions adapted to determine whether a differential position can be created from the received SBAS correction messages.

18. The computer-readable medium of claim 14, wherein the computer-executable instructions adapted to determine whether at least one criterion is satisfied for using the selected SBAS satellite as a correction source include:

computer-executable instructions adapted to determine whether the selected SBAS satellite is sending SBAS correction messages;

computer-executable instructions adapted to determine whether the SBAS correction messages received from the selected SBAS satellite are reliable if it is determined that the selected SBAS satellite is sending SBAS correction messages; and

computer-executable instructions adapted to determine whether a differential position can be created from the received SBAS correction messages if it is determined that the SBAS

correction messages received from the selected SBAS satellite are reliable.

19. A data structure for use by a Global Positioning System (GPS) receiver device in making Space Based Augmentation System (SBAS) corrections, comprising:

- a field representing a variable array of health information for SBAS satellites;
- a field representing a Current SBAS Correction Source (CSCS) variable index; and
- a field representing a Potential SBAS Correction Source (PSCS) variable index.

20. A data structure for use by a Global Positioning System (GPS) receiver device in making Space Based Augmentation System (SBAS) corrections, comprising:

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a field representing a variable array for a Current SBAS Correction Source (CSCS) valid SBAS message counter and a Potential SBAS Correction Source (PSCS) valid SBAS message counter;

- a field representing a CSCS variable index;
- a field representing a PSCS variable index; and
- a field representing a threshold constant for a difference between the CSCS valid SBAS message counter and the PSCS valid SBAS message counter.

21. The data structure of claim 20, further comprising a field representing a threshold constant for a minimum PSCS valid MSG counter.

22. A data structure for use by a Global Positioning System (GPS) receiver device in making Space Based Augmentation System (SBAS) corrections, comprising:

- a field representing a current timer variable;
- a field representing a swap timer variable;
- a field representing a threshold constant for a difference between the current timer variable and the swap timer variable; and

a field representing a variable that indicates whether any presently-tracked satellite has valid corrections collected from a Current SBAS Correction Source (CSCS).

23. The data structure of claim 23, further comprising:

a field representing a variable that indicates a presently-computed position fix type; and
a field representing a constant assigned to the presently-computed position fix type variable.

24. A data structure for use by a Global Positioning System (GPS) receiver device in making Space Based Augmentation System (SBAS) corrections, comprising:

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a field representing a current timer variable;
a field representing a swap timer variable;
a field representing a threshold constant for a difference between the current timer variable and the swap timer variable;
a field representing a variable that indicates a presently-computed position fix type; and
a field representing a constant assigned to the presently-computed position fix type variable.

25. The data structure of claim 25, further comprising a field representing a variable that indicates whether any presently-tracked satellite has valid corrections collected from a Current SBAS Correction Source (CSCS).

26. A data structure for use by a Global Positioning System (GPS) receiver device in making Space Based Augmentation System (SBAS) corrections, comprising:

a field representing a Current SBAS Correction Source (CSCS) variable index;
a field representing a Potential SBAS Correction Source (PSCS) variable index
a field representing a variable array of health information for SBAS satellites;

a field representing a variable array for a CSCS valid SBAS message counter and a PSCS valid SBAS message counter;

a field representing a threshold constant for a difference between the CSCS valid SBAS message counter and the PSCS valid SBAS message counter;

a field representing a threshold constant for a minimum PSCS valid message counter;

a field representing a current timer variable;

a field representing a swap timer variable;

a field representing a threshold constant for a difference between the current timer variable and the swap timer variable;

a field representing a variable that indicates whether any presently-tracked satellite has valid corrections collected from a CSCS;

a field representing a variable that indicates a presently-computed position fix type; and

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variable.

a field representing a constant assigned to the presently-computed position fix type variable.

27. A Global Positioning System (GPS) receiver device, comprising:

a processor;

a memory adapted to communicate to the processor; and

a GPS receiver adapted to receive GPS signals and Space Based Augmentation System (SBAS) correction signals, and further adapted to communicate with the processor,

wherein the device is adapted to determine a desired SBAS correction source using at least one predetermined criterion.

28. The device of claim 28, wherein the GPS receiver device comprises a portable GPS receiver device.

29. The device of claim 29, wherein the GPS receiver device comprises a personal digital assistant (PDA).

30. The device of claim 29, wherein the GPS receiver device comprises a wireless communication device.

31. The device of claim 28, wherein the at least one predetermined criterion includes an SBAS-correction-sent criterion for verifying that the desired SBAS correction source is sending correction messages.

32. The device of claim 28, wherein the at least one predetermined criterion includes an SBAS-correction-reliable criterion for verifying that the desired SBAS correction source is sending reliable correction messages.

33. The device of claim 28, wherein the at least one predetermined criterion includes a stability-threshold criterion for verifying that the desired SBAS correction source is sending reliable correction messages within a stability threshold.

34. The device of claim 28, wherein the at least one predetermined criterion includes a differential-position-calculation-capable criterion for verifying that the desired SBAS correction source is sending reliable correction messages from which a differential position is capable of being computed.
